

Amendments to the claims:

Please add Claims 43-68 as set forth below. This listing of claims will replace all prior versions and listings of claims in the subject application.

Listing of Claims:

1. (Previously Amended): An article inspection apparatus including:

conveying means for conveying an article through an inspection site and rotating the article about an axis of rotation when the article is in the inspection site;

an imaging system including at least one image capture means as to view from above over a plurality of separate optical paths an article on the conveying means and all components of the imaging system are located separated from and above the conveying means;

and

an illumination system arranged to illuminate the article on the conveying means from above and from the side.
2. (Previously Amended): The article inspection apparatus of claim 1, wherein the imaging system includes first and second image capture means that are spaced apart along the direction of travel of the conveying means.
3. (Previously Amended) : The article inspection apparatus of claim 2, including processing means to analyse images received from the first and second image capture means, the processing means analysing segments of a top view of the article from images captured at different stages of

rotation of the article, the segments having dimensions so as to substantially avoid any overlap between segments.

4. (Original): The article inspection apparatus of claim 3, wherein the field of view of the first image capture means overlaps with the field of view of the second image capture means along the conveying means to an extent sufficient to enable the processing means to identify in the view of the second image capture means the last segment analysed from the first image capture means, and in this way identify an appropriate first segment to analyse from images from the second image capture means so that a substantially continuous picture of the surface of the article results by combining analysed segments from the first and second image capture means.

5. (Original): The article inspection apparatus of claim 4, wherein the extent of overlap is substantially the minimum to maintain said continuous picture of the surface of the article.

6. (Previously Amended) The article inspection apparatus of claim 4, wherein the processing means alters the dimensions of either or both of the last segment from the first image capture means and the first segment from the second image capture means in order to maintain said continuous picture of the surface of the article.

7. (Previously Amended): The article inspection apparatus of claim[s] 1, including processing means operable to receive plural images from said image capture means and from said plural images identify a marking on the article, wherein the processing means then selects at least one image of said marking for analysis purposes according to predetermined criteria.

8. (Previously Amended): The article inspection apparatus of claim 2, wherein the conveying means rotates the article at a speed so that it completes at least one complete revolution, but less than two complete revolutions while within combined fields of view of the first and second image capture means.

9. (Previously Amended): The article inspection apparatus of claim[s] 1, wherein the imaging system has a field of view including opposing first and second upper side views of an article located on the conveying means.

10. (Previously Amended): The article inspection apparatus of claim[s] 9, including two image capture means and wherein each image capture means receives light via a first and a second optical path, and wherein:

the first optical path includes a single reflecting element that receives light from one of said upper side views and directs light received to the image capture means; and

the second optical path includes a first and a second reflecting element, the first reflecting element positioned to receive light from said top view and direct it to the second reflecting element, which redirects the light received to the image capture means, wherein the second reflecting element is located substantially immediately adjacent to said first optical path.

11. (Original): The article inspection apparatus of claim 10, wherein the image capture means has its optical axis centred on a line that bisects said first and second optical paths.

12. (Previously Amended): The article inspection apparatus of claim 10 wherein the first and second optical paths have substantially equal path length.

13. (Previously Amended): The article inspection apparatus as claimed claim 1, wherein said conveying means includes two or more lanes for conveying articles past said imaging system and wherein the apparatus includes processing means operable to distinguish in images taken by said first and second image capture means articles in each lane.

14. (Previously Amended): An article inspection apparatus including two or more article inspection apparatus as claimed in claim 1 located side by side with the respective image capture means of each article inspection apparatus substantially in line with each other.

15. (Previously Amended): The article inspection apparatus of claim 14 wherein the illumination system includes light sources arranged along both sides of each conveying means equidistant from the conveying means, with the light sources between said conveying means located substantially on a vertical plane that intersects the mid-point between the conveying means.

16. (Original): The article inspection apparatus of claim 15, wherein said light sources include at least one light source on a first side of a first conveying means located at a height so as to have a clear line of sight to articles on a second conveying means adjacent to the first conveying means on the opposite side from said first side.

17. (Previously Amended): The article inspection apparatus of claim 15 wherein the illumination system includes at least one light source located approximately in a horizontal plane from articles when located on said conveying means.

18. (Original): The article inspection apparatus of claim 17 wherein the at least one light source located approximately in a horizontal plane from articles includes a light source above the equator of the article and a light source below the equator of the article.

19. (Previously Amended): The article inspection apparatus of claim[s] 17, wherein the light sources are positioned to provide substantially uniform lighting over a spherical surface commensurate with the expected size of articles to be inspected.

20. (Previously Amended): The article inspection apparatus of claim[s] 15 wherein said one or more lighting sources are fluorescent tubes extending parallel to the conveying means.

21-26. (Previously Cancelled)

27. (Previously Added) The article inspection apparatus of claim 1, wherein the imaging system and illumination system do not share any common optical components.

28. (Previously Added) The article inspection apparatus of claim 1, wherein the plurality of separate optical paths have substantially equal optical path lengths.

29. (Previously Added) The article inspection apparatus of claim 9, wherein the first and second upper side views are centred substantially at 45 degrees relative to the axis of rotation.

30. (Previously Added): The article inspection apparatus of claim 9, wherein the imaging system has a field of view including a top view of an article located on the conveying means.

31. (Previously Added): A method of article inspection including:

conveying an article through an inspection site and rotating the article about an axis when it is in the inspection site;

illuminating the article from above and from the side at least when it is in the inspection site;

when the article is illuminated, viewing the article from above through a plurality of separate optical paths, using only optical components located separate from and above the article.

32. (Previously Added) The method of claim 30, including viewing the article from the top and from opposing upper side views.

33. (Previously Added) The method of claim 32, including dividing the total field of view between the top view and upper side views dependent on the shape of articles to be inspected.

34. (Previously Added) The method of claim 33, including viewing less of the upper side view and more of the top view when ellipsoidal shaped objects are to be inspected.

35. (Previously Added) The method of claim 31, wherein the plurality of separate optical paths have a substantially equal path length.

36 (Previously Added): The method of claim 31, wherein the optical components used in the step of viewing the article are separate from any components used in the step of illuminating the article.

37. (Previously Added): An article inspection apparatus including:

a conveying device for conveying an article through an inspection site and rotating the article about an axis of rotation when the article is in the inspection site;

an imaging system including at least one image capture device viewing the article through multiple optical paths comprising a first optical path having a first reflecting element to direct light from a first upper view of the article to the image capture device and a second optical path having second and third reflecting elements, the second reflecting element receiving light from a second upper view of the article and directing received light to the third reflecting element and the third reflecting element directing light to the image capture device;

wherein the first, second and third reflecting elements are positioned separated from and above the conveying device.

38. (Previously Added): The article inspection apparatus of claim 37, wherein the imaging system includes an image capture device that views the article through a third optical path having a fourth reflecting element, the fourth reflecting element receiving light from a third upper view of the article and directing received light to the image capture device.

39. (Previously Added): The article inspection apparatus of claim 38, wherein the imaging system includes an image capture device that views the article through a fourth optical path having fifth and sixth reflecting elements, the fifth reflecting element receiving light from a fourth upper view of the article and directing received light to the sixth reflecting element and the sixth reflecting element directing light to the image capture device.

40. (Previously Added): The article inspection apparatus of claim 39, wherein both the second and fourth upper views are views of the top of the article and the second and fourth optical paths are separated along the path of the conveying device.

41. (Previously Added): The article inspection apparatus of claim 39, including first and second image capture devices, the first image capture device viewing the article through said first and second optical paths and the second image capture device viewing the article through said third and fourth optical paths.

42. (Previously Added): The article inspection apparatus of claim 37, wherein the first and third upper views are views of opposing upper sides of the article the said second and fourth views are top views of the article.

43. (New) An article inspection apparatus including:

conveying means for conveying an article through an inspection site and rotating the article about an axis of rotation as it passes through the inspection site;

an imaging system including an image capture means and a mirror arrangement that defines the field of view of said image capture means, characterized in that

the imaging system is arranged so that the image capture means has a field of view including a top view and a first upper side view of an article on said conveying means, wherein the components of the imaging system and mirror arrangement are located separated from and above the conveying means.

44. (New) The article inspection apparatus of claim 43, including a further imaging system having a second image capture means that has a field of view including a top view and second upper side view of said article, wherein said second upper side view opposes said first upper side view.

45. (New) The article inspection apparatus of claim 44, wherein the first and second upper side views are centered substantially at 45 degrees relative to the axis of rotation.

46. (New) The article inspection apparatus of claim 44, wherein the first and second image capture means are spaced apart along the direction of travel of the conveying means.

47. (New) The article inspection apparatus of claim 46, including processing means to analyze images received from the first and second image capture means, the processing means analyzing segments of the top view of the article from images captured at different stages of rotation of the article, the segments having dimensions so as to substantially avoid any overlap between segments.

48. (New) The article inspection apparatus of claim 47, wherein the field of view of the first image capture means overlaps with the field of view of the second image capture means along the conveying means to an extent sufficient to enable the processing means to identify in the view of the second image capture means the last segment analyzed from the first image capture means, and in this way identify an appropriate first segment to analyze from images from the second image capture means so that a substantially continuous picture of the surface of the article results by combining analyzed segments from the first and second image capture means.

49. (New) The article inspection apparatus of claim 48, wherein the extent of overlap is substantially the minimum to maintain said continuous picture of the surface of the article.

50. (New) The article inspection apparatus of claim 48, wherein the processing means alters the dimensions of either or both of the last segment from the first image capture means and the first segment from the second image capture means in order to maintain said continuous picture of the surface of the article.

51. (New) The article inspection apparatus of claim 44, wherein the conveying means rotates the article at a speed so that it completes at least one complete revolution, but less than two complete revolutions while within combined fields of view of the first and second image capture means.

52. (New) The article inspection apparatus of claim 44, including processing means operable to receive plural images from said image capture means and from said plural images identify a marking on the article, wherein the processing means then selects an image of said marking for analysis purposes according to predetermined criteria.

53. (New) The article inspection apparatus of claim 44, wherein each image capture means receives light via a first and a second optical path, and wherein:

the first optical path includes a single reflecting element that receives light from one of said upper side views and directs light received to the image capture means; and

the second optical path includes a first and a second reflecting element, the first reflecting element positioned to receive light from said top view and direct it to the second

reflecting element, which redirects the light received to the image capture means, wherein the second reflecting element is located substantially immediately adjacent to said first optical path.

54. (New) The article inspection apparatus of claim 53, wherein the image capture means has its optical axis centered on a line that bisects said first and second optical paths.

55. (New) The article inspection apparatus of claim 53 wherein the first and second optical paths have substantially equal path length.

56. (New) The article inspection apparatus of claim 44, wherein said conveying means includes two or more lanes for conveying articles past said imaging system and wherein the apparatus includes processing means operable to distinguish in images taken by said image capture means articles in each lane.

57. (New) An article inspection apparatus including two or more article inspection apparatus as claimed in claim 44 located side by side with the respective image capture means of each article inspection apparatus substantially in line with each other.

58. (New) The article inspection apparatus of claim 57 including light sources arranged along both sides of each conveying means equidistant from the conveying means, with the light sources between said conveying means located substantially on a vertical plane that intersects the mid-point between the conveying means.

59. (New) The article inspection apparatus of claim 58, wherein said light sources include at least one light source on a first side of a first conveying means located at a height so as to have a clear line of sight to articles on a second conveying means adjacent to the first conveying means on the opposite side from said first side.

60. (New) The article inspection apparatus of claim 59 wherein said one or more light sources include at least one light source located approximately in a horizontal plane from articles when located on said conveying means.

61. (New) The article inspection apparatus of claim 60 wherein the at least one light source located approximately in a horizontal plane from articles includes a light source above the equator of the article and a light source below the equator of the article.

62. (New) The article inspection apparatus of claim 61, wherein the light sources are positioned to provide substantially uniform lighting over a spherical surface commensurate with the expected size of articles to be inspected.

63. (New) The article inspection apparatus of claim 62 wherein said one or more lighting sources are fluorescent tubes extending parallel to the conveying means.

64. (New) A method of article inspection including:

conveying an article through an inspection site and rotating the article about an axis as it passes through the inspection site; and

using an image capture device and a mirror arrangement both located separated

from and above the plane through which the article is conveyed through the inspection site, viewing a top view and a first upper side view of an article as it passes through the inspection site.

65. (New) The method of claim 64 further including using a second image capture device, viewing a top view and a second upper side view of an article as it passes through the inspection site, the second upper side view opposing said first upper side view.

66. (New) The method of claim 65 including dividing the total area viewed by each of the first and second image capture devices between said top view and upper side view dependent on the shape of articles to be inspected.

67. (New) The method of claim 66 including viewing less of the upper side view and more of the top view for ellipsoidal shaped objects.

68. (New) The method of any claim 64 including analyzing segments of images from said image capture devices, the segments collectively defining the entire top view of the article as it passes through the inspection site substantially without overlap or omission of portions of the surface of the article.